

1st. Asia Automobile Institute Summit
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On the Road to Sustainable Mobility in Asia

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Major Issues for Sustainable Mobility

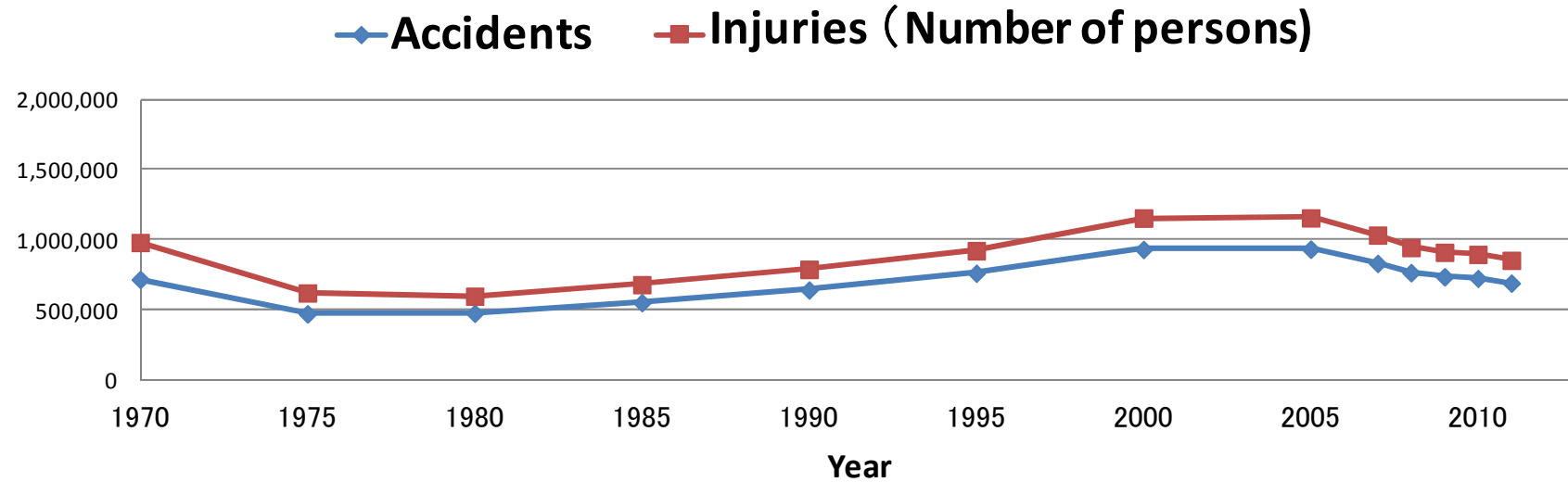
- ✓ *Achieving Greater Road Safety*
- ✓ *Addressing Climate Change (CO₂ Emissions Reduction)*
- ✓ *Improving Air Quality*
- ✓ *Reducing Automobile-Emitted Noise*
- ✓ *Vehicle Recycling and Waste Reduction*



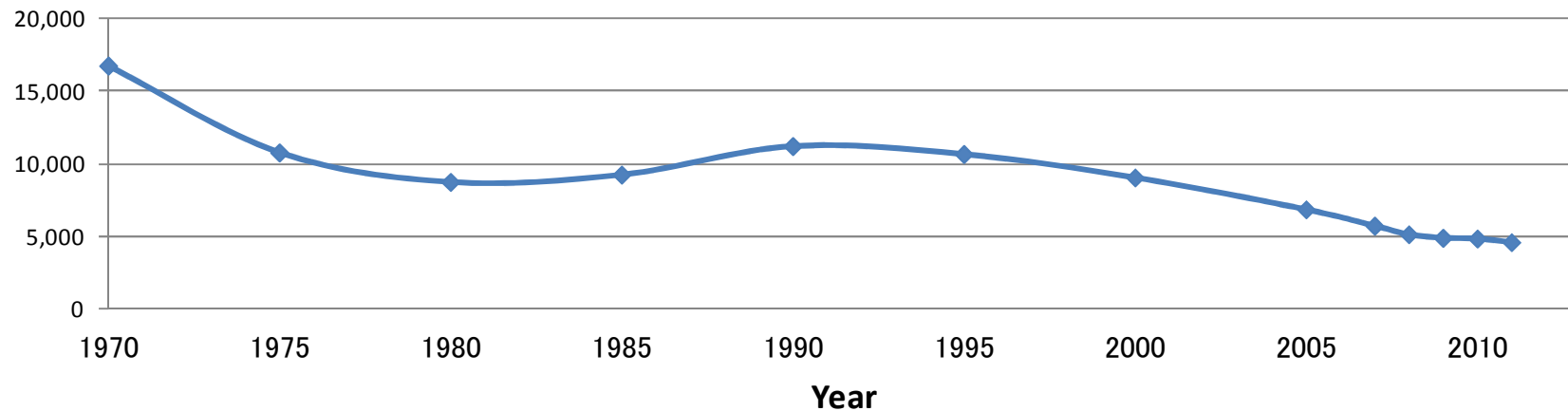
Major Issues for Sustainable Mobility

- ✓ Achieving Greater Road Safety
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- ✓ Improving Air Quality
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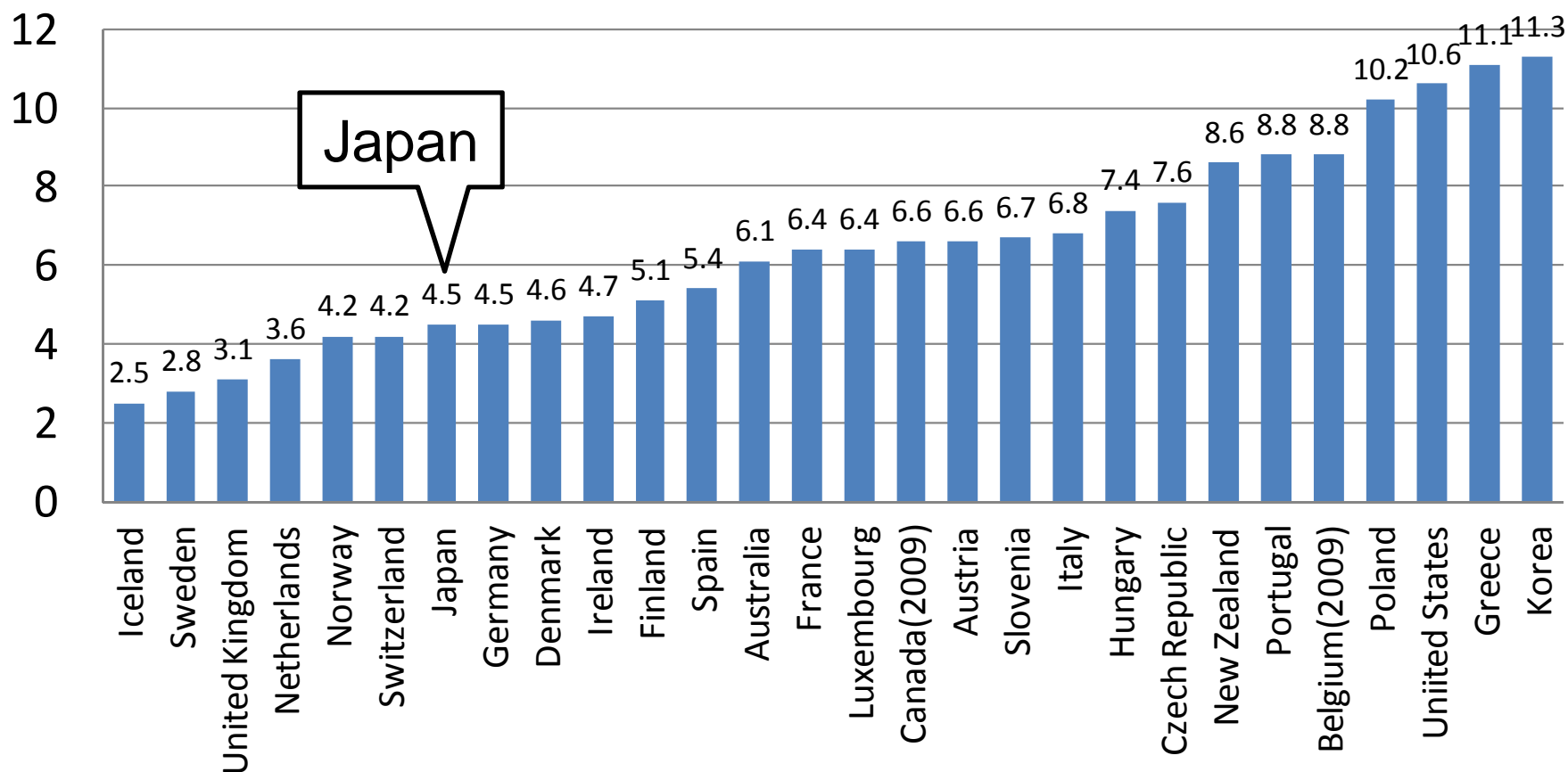
Status of Road Accidents in Japan (Road Accidents / Injuries / Fatalities)



Road Fatalities (Number of persons)



Road Fatalities per 100,000 Population in 2010



Source: Road Safety Annual Report 2011

Vehicle Safety Features in Recent Years

Active Safety

- Collision-mitigation braking system
- Approaching vehicle warning
- Inter-vehicle distance warning
- Adaptive cruise control
- Lane-keeping assist
- Blind-corner monitoring
- Night vision monitoring
- Navigator-based gearshift control
- Adaptive front-lighting system
- Park assist

Passive Safety

- Automatic pop-up hood
- Pre-crash seatbelt
- Active head restraints
- Curtain airbags
- Pedestrian protection vehicle design
- ISOFIX anchorages
- Advanced compatibility vehicle structure
- Rollover curtain airbags
- Knee airbags
- Motorcycle airbags

Road Safety Targets & Eight Major Activities in Japan

Japan's Road Safety Targets

- To reduce the annual number of road fatalities (occurring within 24 hours post-accident) to below 3,000 by 2015, and thus to make Japan's roads the safest in the world.
- To reduce the total annual number of road fatalities (occurring within 24 hours post-accident) and injuries to below 700,000 by 2015.

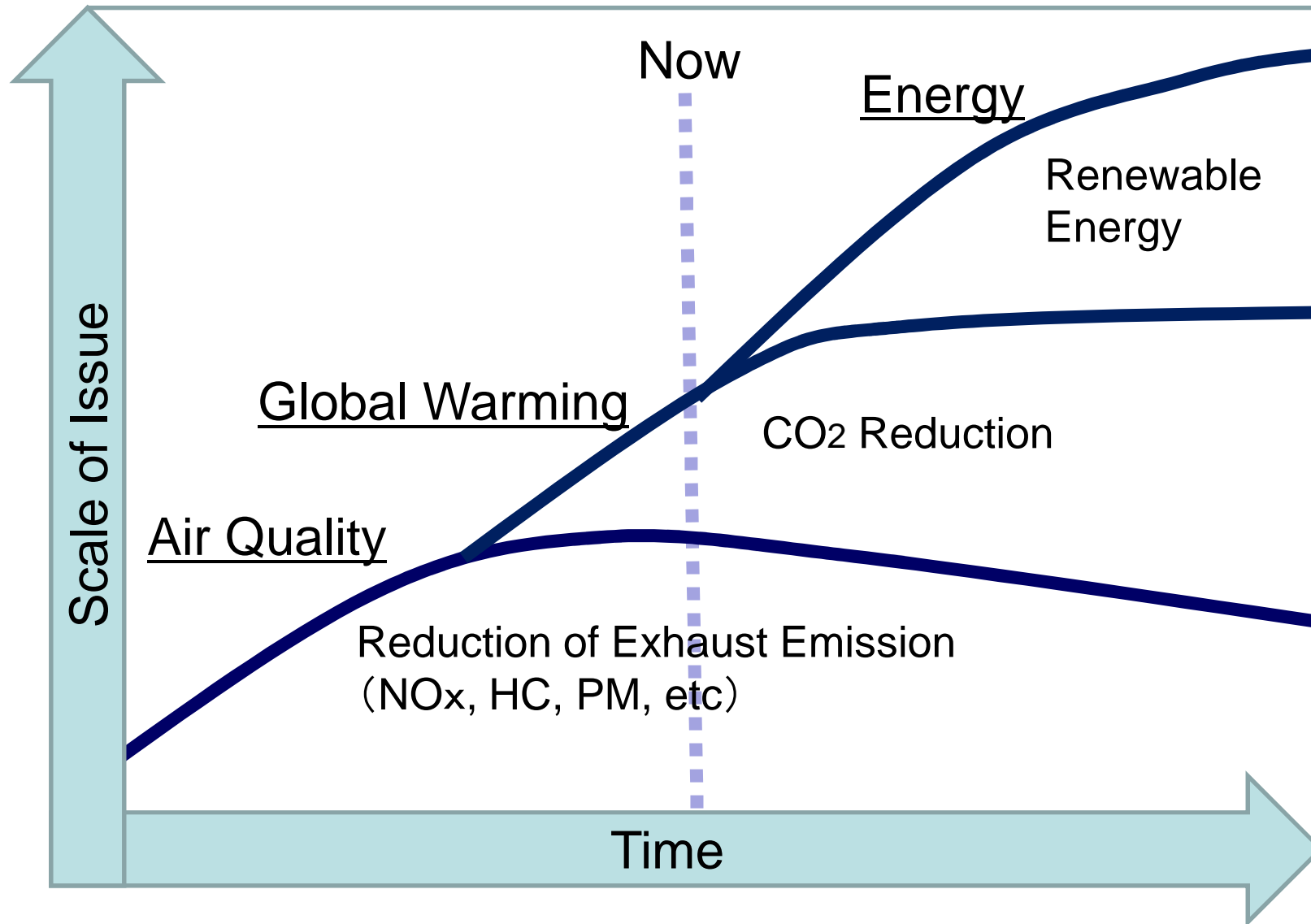
Eight Major Road Safety Activities in Japan

1. Road infrastructure improvements
2. Promotion of safe driving
3. Enforcement of road traffic laws
4. Provision of fair compensation for road accident victims
5. Road safety public awareness campaigns
6. Enhancement of vehicle safety
7. Reinforcement of emergency rescue operations infrastructure
8. Promotion of road safety research and analysis

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Trends in Environment / Energy Issues



Climate Change

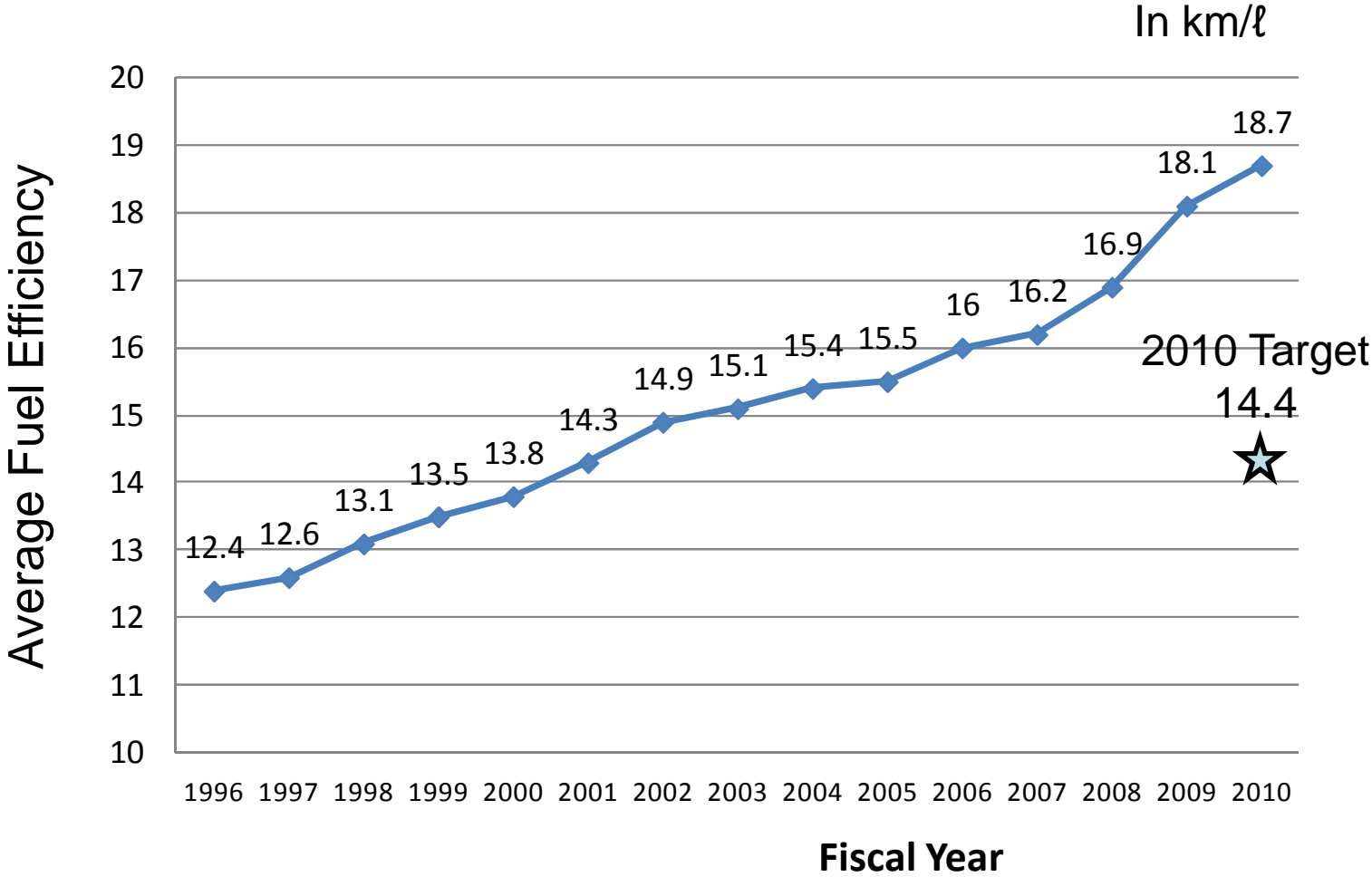
- ✓ *Improving Vehicle Fuel Efficiency*
- ✓ *In-Use Status of Alternative-Energy/Next-Generation and Fuel-Efficient Vehicles*
- ✓ *Improving Traffic Flow*



Improving Vehicle Fuel Efficiency in Japan



Average Fuel Efficiency of Domestic New Gasoline-Powered Passenger Cars



Source: Japan Automobile Manufacturers Association

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Improving Vehicle Fuel Efficiency

Vehicle Technologies for increased Fuel Efficiency

Mazda: SKYACTIVE-G

- The world's highest compression ratio of 14.0
- Fuel consumption of 25 km per liter in JC08-mode



Demio

Daihatsu: Energy Saving Technology

- Improved engine efficiency
- Improved powertrain performance
- Reduced vehicle weight (Downsizing)
- Reduced aerodynamic drag
- Idling prevention (stop-start)
- Regeneration of deceleration energy
- Fuel consumption of 30 km per liter in JC08-mode



Mira e:S

Source: Mazda website and Daihatsu website

In-Use Status of Next-Generation Vehicles

NISSAN: LEAF

- EV
- Lithium-ion battery (Capacity:24kWh/Output:90kW)
- Electric motor (80kW)
- Mileage per charge: 200 km in JC08-mode
- Interchange electric energy consumption rate (Electric power per 1 km): 124 Wh/km in JC08-mode



TOYOTA: PRIUS PHV

- Plug-in hybrid car
- Lithium-ion battery
- 1.8L gasoline-engine (73kW)
- Electric motor (60kW)



GM: Volt

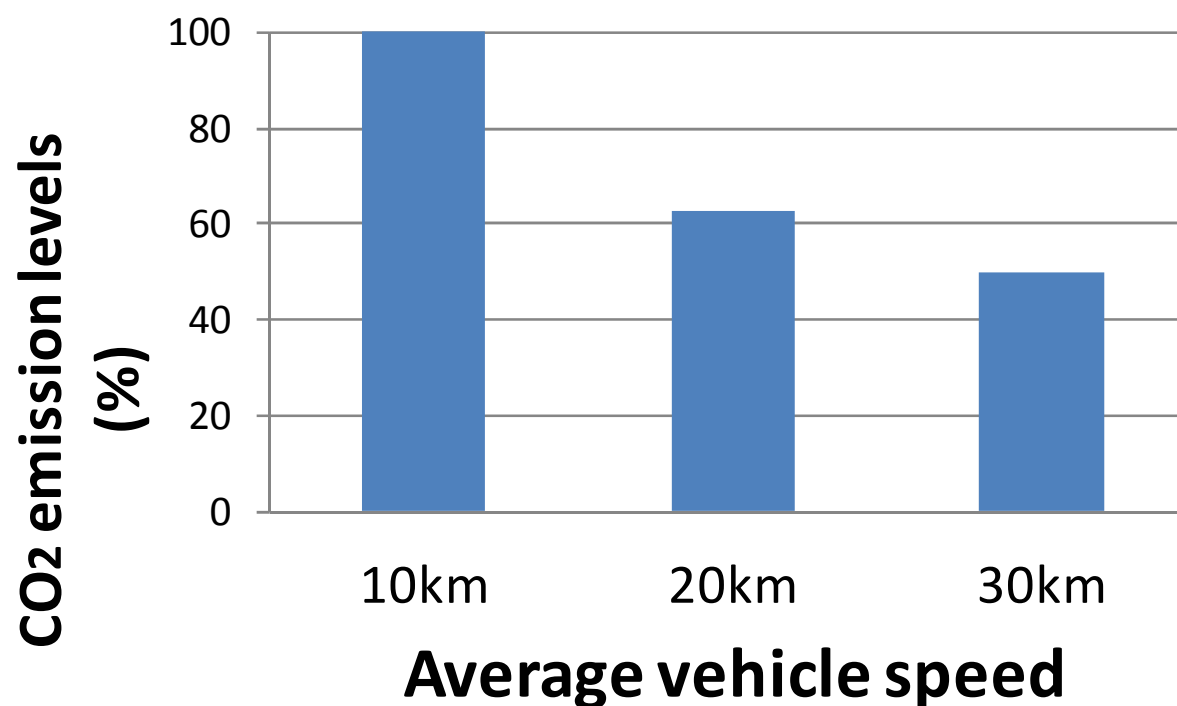
- Plug-in hybrid car
- Lithium-ion battery
- 1.4L gasoline powered range extender (83 hp)



Source: Nissan website, Toyota website, GM website

Improving Traffic Flow for CO₂ Emissions Reduction

Impact of vehicle speed on CO₂ emissions



Source: Japan Automobile Manufacturers Association

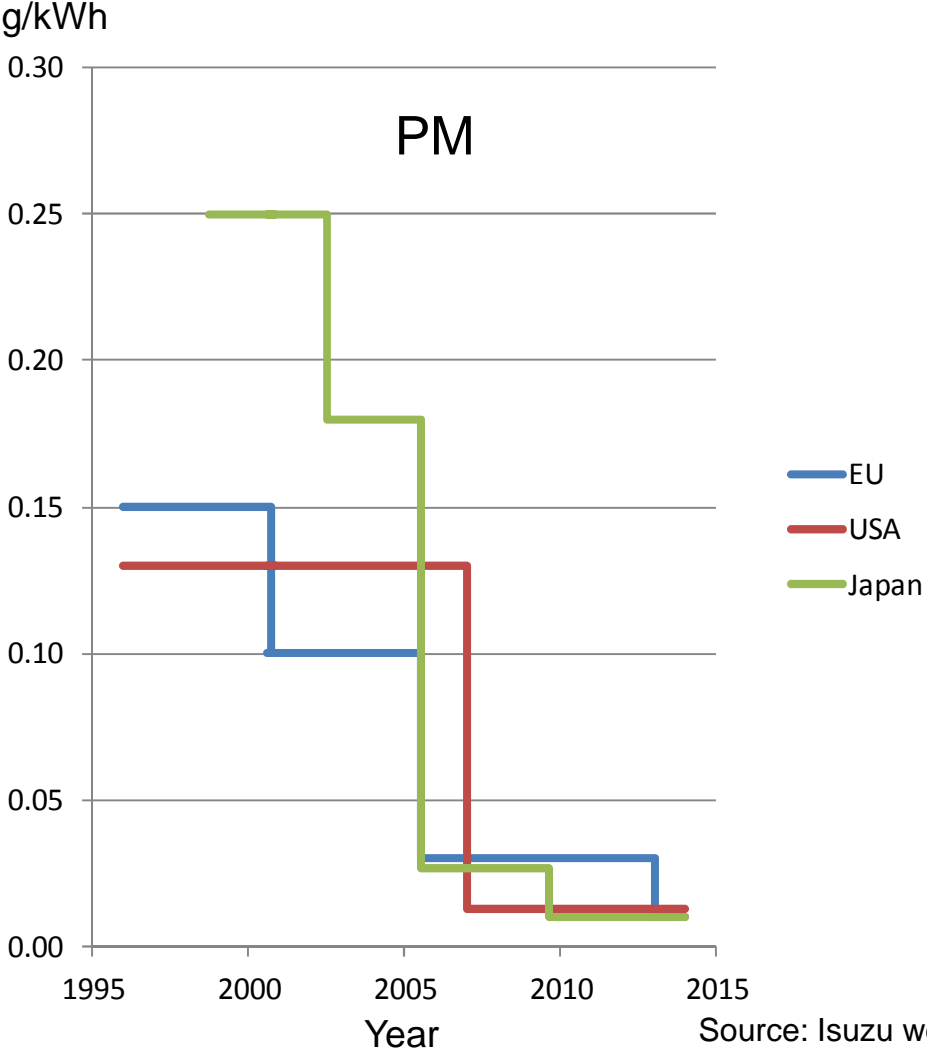
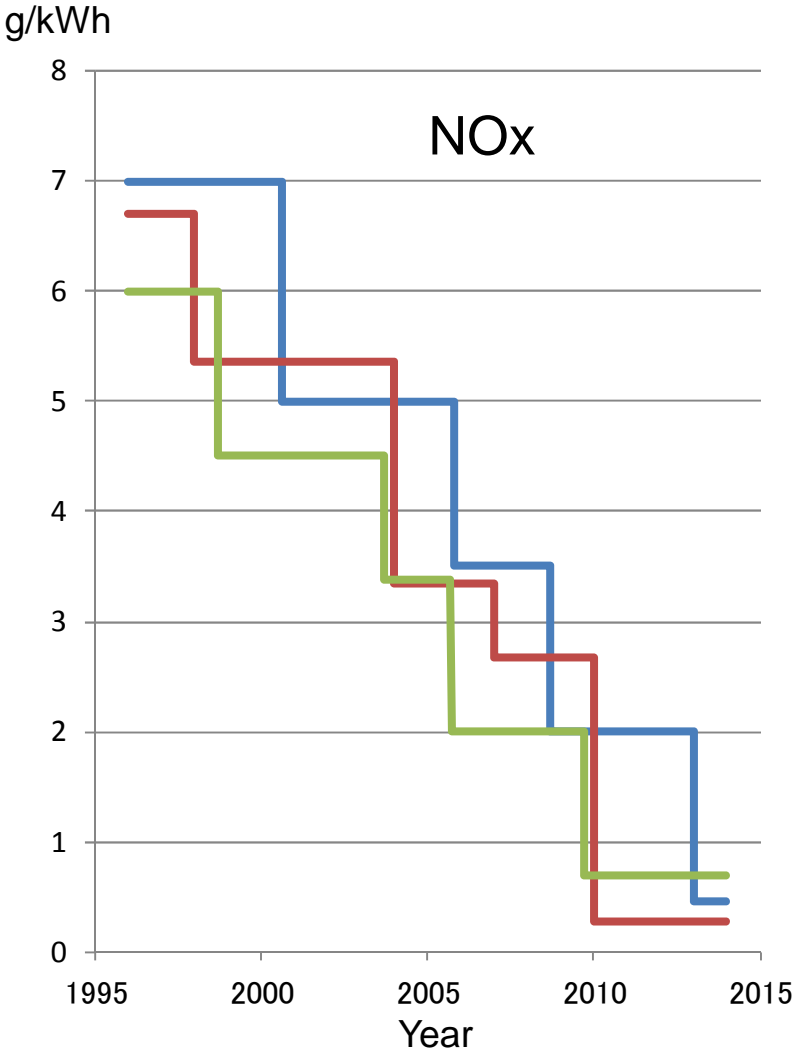
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Improving Air Quality

Trend in Heavy-Duty Diesel Truck Emissions Regulations



Source: Isuzu website

Gasoline Emission Control Technology



Develop engine management

Develop control technology

- Increase control precision for A/F ratio, ignition timing
- Improve OBD detection performance

Use thermal energy

- Heat cylinder head, port
- Heat intake air, etc.

Develop exhaust system parts

- Reduce heat capacity
- Secondary air
- Control exhaust temperature

Improve engine combustion

- Fine spray Injector
- Intake air control (High Swirl), etc.

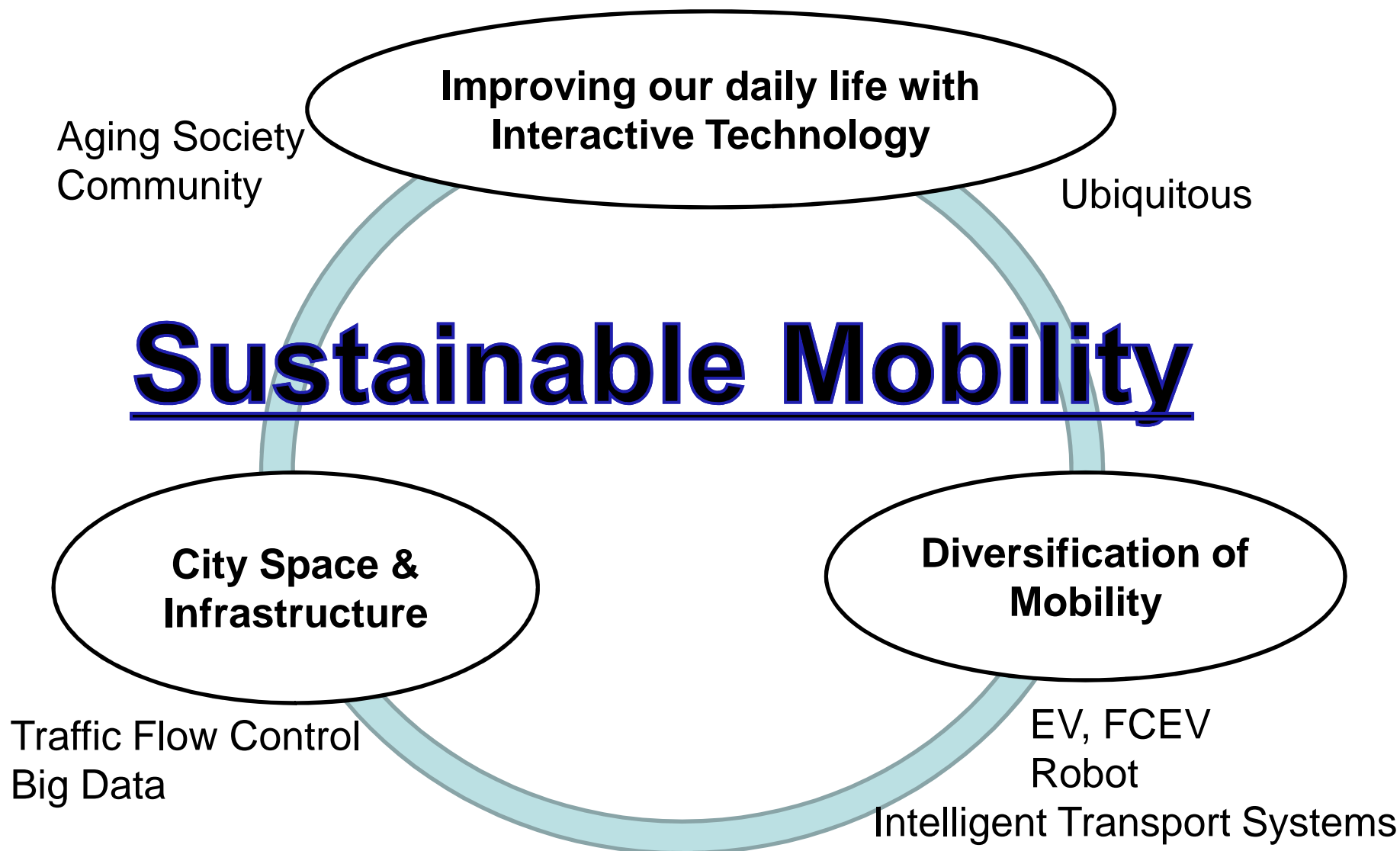
Develop valve mechanism

- Variable valve timing
- Variable valve lift

Improve catalyst performance

- Improve catalyst
Low-temperature activation
- Adsorption purification catalyst

On the Road to Sustainable Mobility



Thank you for your attention.